

REMARKS

Applicants have amended claims 1, 33, and 40-78 as set forth above.

Applicants note with appreciation the indication through the absence of any prior art rejections in the outstanding Office Action that dependent claims 2-32, 34-39, 41-71, and 73-78 are patentably distinguishable over the prior art of record. In view of the above amendments and the following remarks, reconsideration of the outstanding office action is respectfully requested.

The Office has provisionally rejected claims 2, 4-6, 8, 41, 43, 45, and 47 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 09/995,222. Accordingly, a timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) accompanies this amendment. In view of the foregoing remarks and the accompanying terminal disclaimer, the Office is respectfully requested to reconsider and withdraw the provisional rejection of claims 2, 4-6, 8, 41, 43, 45, and 47.

The Office has rejected claims 1-78 under 35 U.S.C. 101 asserting that the rejected claims do not recite a useful result, claims 1-11, 16-32, 40-50 and 55-71 under 35 U.S.C. 112, first paragraph, asserting these claims fail to clearly define the output of the invention, and claims 40-78 under 35 U.S.C. 112, second paragraph, asserting the term, "computer program product" is vague and indefinite. More specifically, the Office asserts that claims 1-11, 16-32, 40-50 and 55-71 are rejected under 35 U.S.C. 101 because the Office asserts the claims do not recite a concrete result. The Office also asserts the claims are not concrete because the cited claims do not clearly define the output of the invention. Further, the Office asserts claims 40 and 72, recite "A computer program product ... comprising machine executable code" and the term "product" is indefinite because it could refer to a program, to computer readable media, etc.

Accordingly, Applicants have amended claims 1, 33, and 40 as set forth above to clearly define an output and a useful result and have amended claims 40-78 to clarify that these claims recite a computer readable medium. In view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejections of these claims under 35 U.S.C. 101, 112, first paragraph and 112, second paragraph.

The Office has rejected claims 1, 33, 40, and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over FEMLAB in view of Brenner. The Office asserts the FEMLAB® Reference Manual teaches: "The core of FEMLAB is a set of algorithms for

discretizing and solving Partial Differential Equations (PDE).” (see pages 3-21 to 3-27, the quote is on page 3-21); the use of Dirichlet and generalized Neumann boundary conditions in the coefficient form of PDE (see page 3-23); the use of Jacobians to solve PDE in the coefficient form (see pages 3-26 to 3-27), and a non-linear solver for obtaining the Jacobians (see pages 3-60 to 3-66); and the “weak form” (or “variational form”) of the differential of the partial differential equation (see pages 3-40 to 3-41). The Office acknowledges that the FEMLAB® Reference Manual, Version 1.0 does not teach the use of “at least one non-local coupling” to determine a representation of a partial differential equation system, but asserts that Brenner teaches that “we wish to derive estimates for the error, $u - u_s$, in the point-wise sense” (See Brenner: p.12, Section 0.7 “Local Estimates”). The Office interprets these “Local Estimates” correspond to the claimed “non-local coupling” and asserts it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of FEMLAB® Reference Manual, Version 1.0 with those of Brenner because doing so would help estimate the point-wise error.

Neither FEMLAB nor Brenner, alone or in combination, disclose or suggest, *inter alia*, “determining a representation of a partial differential equation system for each application mode corresponding to one of said plurality of systems using at least one non-local coupling, said at least one non-local coupling determining a value in at least one portion of a domain depending on a value from at least one other portion of a domain” as recited in claims 1 and 40. Brenner merely discloses how to derive an error estimate, not how to use non-local coupling to determine a value in at least one portion of a domain depending on a value from at least one other portion of a domain for determining a representation of partial differential equations. The Office’s attention is respectfully directed to page 125 in the above-identified patent application which states, “there are both local and nonlocal couplings that may be included in an embodiment. Generally, variables may be evaluated locally which is to say that their value at each evaluation point may be computed using information at that particular evaluation point. It is also possible to define nonlocal coupling variables for which the value at each evaluation point is the result of a computation carried out elsewhere in the same geometry or within another geometry. These variables may then be used, for example, in the PDE coefficients or during post processing.” (Emphasis added). Additionally, the Office’s attention is respectfully directed to pages 77-78 of the above-identified patent application which provides examples of non-local coupling and states, “A non-local coupling, for example, may be used in coupling a value of a physical quantity from one portion of a

domain to another portion of the same domain." (Emphasis Added) If Brenner was combined with FEMLAB as suggested by the Office it would merely disclose how to derive an error estimate and neither of the cited references would teach or suggest the non-local coupling as claimed.

Additionally, as set forth above and in the outstanding office action, no basis for rejecting claims 33 and 72 has been asserted by the Office. The rejection under 35 USC Section 103 is directed to claims 1 and 40. Accordingly, it is unclear to Applicants whether the inclusion by the Office of claims 33 and 72 in this rejection with claims 1 and 40 was simply a typographical error. Neither FEMLAB nor Brenner, alone or in combination, disclose or suggest, "determining a stiffness matrix by evaluating at least one of a Jacobian of a variable and a value of a variable in accordance with a type of said variable included in said system, said Jacobian of said variable being represented as at least one contribution in accordance with a number of degrees of freedom; determining a residual vector by evaluating at least one of a Jacobian of a variable and a value of a variable in accordance with a type of said variable included in said system, said Jacobian of said variable being represented as at least one contribution determined in accordance with a number of degrees of freedom; and providing a finite element discretization of said system based on said determining a stiffness matrix and said determining a residual vector" as recited in claims 33 and 72.

Accordingly, in view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 1, 33, 40, and 72.

In view of all of the foregoing, applicant submits that this case is in condition for allowance and such allowance is earnestly solicited.

Respectfully submitted,

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